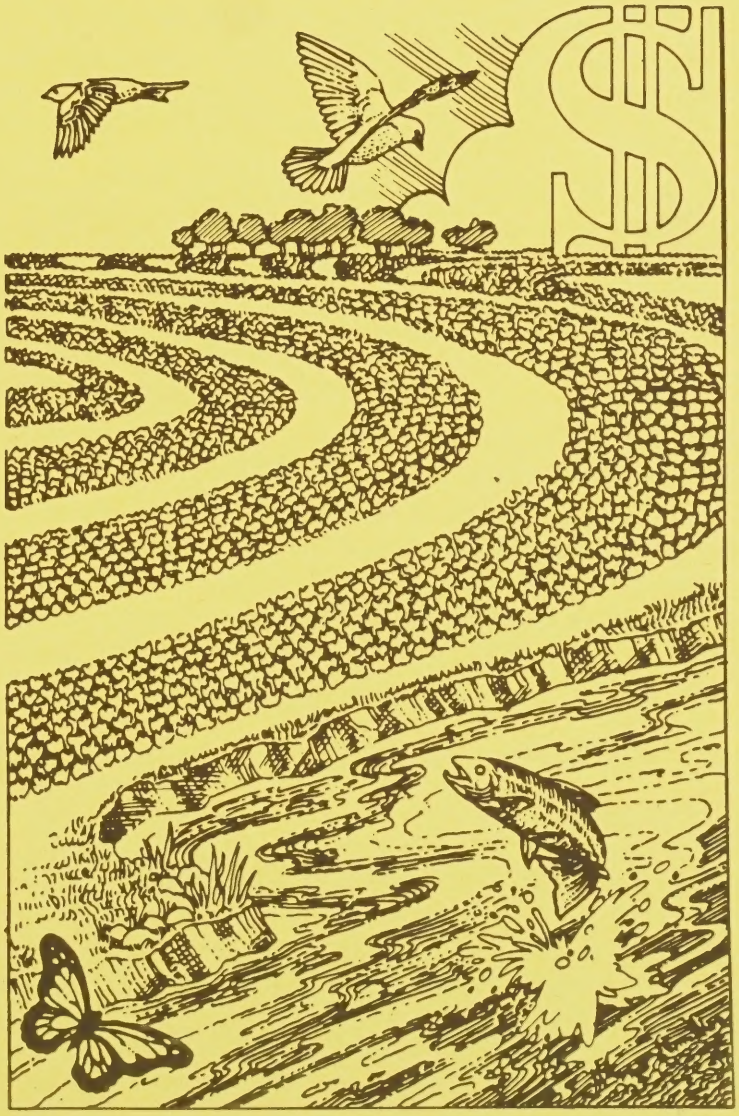
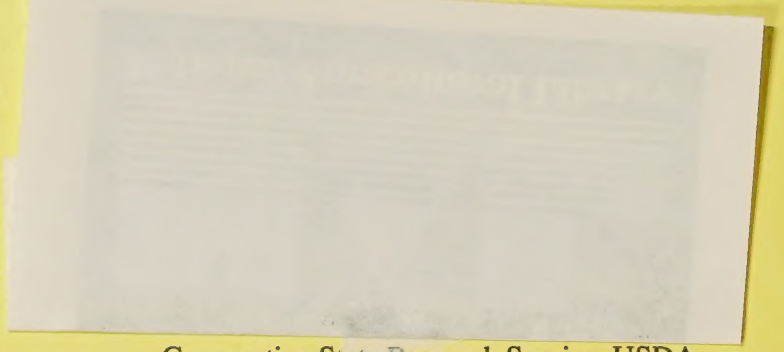
OHIO

North-Central Region Projects Supported by Sustainable Agriculture Research and Education Program





Cooperative State Research Service, USDA
in cooperation with Extension Service, USDA
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from project reports

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Overview of Ohio Projects

Congress has provided strong and growing support for the Sustainable Agriculture Research and Education grants program, also known as LISA (Low-Input Sustainable Agriculture). Administered by Cooperative State Research Service (CSRS), with the Cooperative Extension Service as a full partner, this program is forging partnerships between farmers, scientists, educators, agribusiness, non-profit organizations, and government -- a partnership that is beginning to promote better stewardship of the Nation's natural resource base. The program has supported 112 new projects since its inception in 1988; perhaps two dozen more will be funded by June.

Projects funded are typically carried out by teams of farmers, university research and education staff, government agencies, non-profit organizations, and private enterprise. Top priority is given to whole-farm integrated systems projects, usually including on-farm research and demonstrations. These projects are providing scientific documentation of low-input sustainable farming practices and systems, in comparison with conventional or chemical-intensive agriculture.

Farmer involvement is one of the strengths of this program. There has been active involvement in the administration of the North Central Region LISA program since its inception. Five producers from the region have served on the Administrative Council which develops policy and distributes funds. Six producers have also served on the Technical Committee which evaluates and recommends project proposals for funding.

Nationwide, 1,860 farmers have participated in projects during the first three years. When farmers participate in the planning and execution of a project, two important things happen. Concerns of farmers are foremost in the design of the project. And scientists get directly exposed to innovative ideas developed or tried by farmers. These ideas often become an integral part of scientific studies. The result is both better science and a more widespread adoption of more sustainable farming methods that are economically viable, socially acceptable, and environmentally sound, assuring cleaner water and a plentiful supply of safe food for generations to come.

The coordinators of Ohio projects were asked about participating farmers. Here is what they reported:

- A total of 10 Ohio farmers have participated in LISA research and education projects;

- 3 are reported to have helped generate ideas for these projects, and 1 helps manage a project;

- 4 farmers are helping with the evaluation of projects; and

- One producer (Rex Spray) is serving a 3 year term on the Technical Committee.

Projects Funded 1988-1990

Five projects funded by this program that include Ohio scientists, farmers, or educators in major roles are described here. These projects received a total of $258,794, and provided $377,127 matching funds. In most of the projects, a scientist serves as the Project Coordinator. In others, a farmer or other local area residents are contributing to a multi-state project headquartered in another state.

Economic, Ecological and Environmental Analysis of Farms Under Long-Term Lower Chemical Input Management (LNC90-26)

Summary

This multidisciplinary study includes economic and ecological systems analysis of three established lower chemical input farms. These farms have been under lower chemical input management for up to 25 years. They represent a range of farm systems in diverse geographical locations relevant to a variety of locations in the North Central Region. The farms include the Hartzler's dairy/field crop farm in northeast Ohio, the Spray's beef/field crop farm in central Ohio, and the Elston's cash grain farm in northwest Ohio. A major aim will be to provide data on combined animal and crop production.

The economic analyses will be based on detailed farm budget records maintained by the cooperating farmers. On each farm scientists will quantify the soil biological, physical and chemical characteristics and conduct on-farm experiments to assess the influence of various soil amendments on soil fertility and crop growth. Information from this project will be disseminated to farmers and extension personnel through farm demonstrations, workshops and a mentor-farm/apprentice-farmer program for about 100 farmers.

Project Coordinator: Benjamin R. Stinner, **Ohio State University**

Major Participants: **Ohio State University:** C. Edwards, J. Blair, N. Creamer, K. Enshayan, D. Stinner, S. Traina, M. Batte, D. McCartney, J. Bater, P. Bohlen, M. Wander, R. Kuperman; **Wisconsin Rural Development**: J. Ennis; **Michael Fields Institute**: W. Goldstein, J. Hall; **Rodale Research Center**: R. Janke, K. Kroll.

Farmers: **Ohio:** Hartzler, Spray Brothers, and Elston's Farm

Project Duration: 2 Years (Funding from September 1, 1990 to September 1, 1992)

Total Funding: LISA Funds: $92,344; Matching Funds: $238,019

Low-Input Ridge Tillage System for the Corn Belt (LNC88-3)

Summary

Where ridge tillage is successful, crop yields are maintained or increased. Corn and soybean yields are usually maintained and often increase, especially on poorly drained or compacted soils. Production costs (notably herbicide and tillage costs) are reduced; less use is made of tractors and machinery, thus lowering costs for repairs, maintenance and fuel; and less labor is required. Because herbicide rates and costs are reduced by two-thirds, environmental impacts are reduced. Crop residues between the ridges minimize erosion and movement of chemicals into waterways. Agronomic research and economic analysis shows that ridge tillage is profitable on at least half of the corn/soybean land in the region. The purpose of this project was to determine more explicitly those conditions where ridge tillage can provide an economic and environmental improvement over conventional tillage practices.

Ridges were formed on a total of 165 acres of corn (1988-1989) at the Ohio Farm Science Review site. Two Ohio State University research farms where ridge tillage has been a part of experiments for 6 years, and several farmers with up to 24 years experience with ridge till have become part of the research, coordinated by Randall Reeder at Ohio State University.

- An experiment involving a western Ohio farmer (1988) using three passes with a rotary hoe instead of herbicides banded over the row resulted in yields being the same for both corn and soybeans. Weed control cost was reduced by two-thirds.

- Ridge till farmers in Ohio, Indiana and Illinois experienced cost reductions averaging $23.50 per acre for corn and $19.92 per acre for soybeans. There were no reports of yield decrease.

- Yields for 5 years of ridge till (1984-1988) in a corn/soybean rotation in Ohio were compared to yields for the previous 3 years of continuous corn in intensive tillage on the same plots. Corn yields doubled.

- In southwestern Iowa, surface runoff was reduced 53% and soil erosion was reduced 87% by adoption of ridge tillage.

- Ridge till farmers have also reduced their use of fertilizer without affecting yield or soil test measurements. They also reported increases in earthworm populations

- Economic analysis done by Purdue University scientists indicated that ridge till offers the highest returns on most soils. Compared with fall-plowing, ridge tillage increased profits by $9 to $27 per acre in a corn-soybean rotation, and by $9 to $29 in continuous corn. No-till is most profitable on sloping, highly erodible soils.

Project Coordinator: Randall Reeder, **Ohio State University**

Major Participants: **Ohio State University**: D. Ecker, C. Fendrick, L. Whiting, A. Lines, C. Edwards, B. Stinner, N. Creamer, R. Holmes, E. Ozkan; **USDA Agricultural Research Service**: N. Fausey; **Purdue University**: D. Moore, S. Parsons, D. Baker, D. Griffith

Farmers: **Ohio:** D. McNelly; **Illinois:** D. Klor; **Indiana:** J. Alexander, C. Eppley

Project Duration: 2 Year

Total Funding: LISA Funds: $24,300; Matching Funds: $70,899

Sustainable Agriculture Educational Displays (LNC88-8)

Summary

This request, though relatively small, had the potential of impacting up to 120,000 people in one year alone. The 1988 Farm Science Review, the "Showcase of Ohio Agriculture" coincided with the International Conference on Sustainable Agricultural Systems held in Columbus from September 19-23, 1988. Because of this and increased public interest in Sustainable Agriculture, the Farm Science Review Board agreed to make Sustainable Agriculture a main theme. A committee was formed with a representative from almost every department in the College of Agriculture. The committee designed educational displays on Sustainable Agriculture to be used as part of their departmental displays. In addition, a centralized display aimed at introducing the issues and defining "What is Sustainable Agriculture" was constructed. The displays were made with high quality materials so they can be used at other upcoming events.

Project Coordinator: Clive Edwards, **Ohio State University**

Major Participants: **Ohio State University:** N. Creamer, B. Lyon

Project Duration: 1 Year

Total Funding: LISA Funds: $4,000; Matching Funds: $4,000

An Integrated Research/Extension Program in Low-Input Crop Production for Ohio (LNC88-15)

Summary

This project lays the foundation for continuing research and educational programs in low-input agriculture in Ohio. The project proposes to maintain a set of successfully established research/demonstration plots located in two major land resource areas in Ohio, which will allow evaluation of the interactive effects of differing crop rotation sequences and levels of input on crop productivity, soil and ecosystem characteristics, and profitability. Rotations include corn-soybean and corn-soybean-wheat-legume, with each crop in each rotation appearing each year. Treatments (with 3 replications) include no chemical inputs, chemical inputs at recommended levels, and substitution of manure for fertilizer. Plot experiments will also allow continued monitoring of the evolution of different systems, providing a basis for recommendations dealing with low-input systems at different stages of development.

Project Coordinator: Donald J. Eckert, **Ohio State University**

Major Participants: **Ohio State University**: R. Lal

Project Duration: 1 Year

Total Funding: LISA Funds: $78,000; Matching Funds: $13,500

Utilization of the Allelopathic Properties of Winter Rye as a Method of Weed Control in Soybean Production (LNC88-21)

Summary

A two-year field study was initiated in 1989 by scientists with the Rodale Institute and the University of Wisconsin. Three experiments were done at the University of Wisconsin's Arlington Research Farm, and at seven on-farm sites throughout the Midwest. The purpose of this project was to determine the effectiveness of a cover crop (winter rye) to control weeds in soybean production. Various methods of managing the rye cover crop were examined. A major challenge is to terminate the rye cover crop in a way that will retain its allelopathic weed control power, while avoiding a regrowth or "retillering" of the rye that could tower over the soybeans, greatly reducing their yield.

In the *first experiment*, fall-planted winter rye was killed via three methods (glyphosate, mowing and tillage) and at three different growth stages (tillering, boot, and pollination). Rye that was killed with herbicide (glyphosate) plus mowing adequately controlled weed populations equal to the herbicide treatment checks. Rye killed by chisel plowing did not adequately control weeds at any stage. The exception was that rye killed at the tillering stage with glyphosate exhibited a significant decrease in weed control compared to herbicide checks, perhaps due to the lower quantity of rye biomass.

The *second experiment* conducted at Arlington evaluated rye and oat in combination with a hairy vetch companion crop for weed control in no-till soybean. The oat winter-killed (as expected) and the rye was killed with glyphosate. There was no difference in percent weed control between the narrow row soybean planted into rye and the narrow row or wide row soybean with no cover that received an application of a pre-emergence herbicide. The weed control for all these treatments ranged from 88 to 95% control.

The *third experiment* evaluated four herbicides and cultivation for their ability to control rye which re-tillered after mowing in the boot stage. The objective was to enhance the allelochemical control of annual weeds by allowing additional rye biomass accumulation after planting soybeans in 30" rows. All grass herbicides, applied 14 or 21 days after mowing, adequately (83%) controlled the re-tillering rye regardless of rate. Cultivating two times controlled the rye at levels comparable to the grass herbicide treatments. A single cultivation and glyphosate, applied prior to mowing, had slightly higher weed control (98%), than all other treatments except the glyphosate-only treatment. Weed control was enhanced when herbicides were applied later in the season.

Description of Participating Ohio Farmer

Nancy, Richard and Tim Bennet (Napoleon, OH). This is a 450-acre hog farm in northwestern Ohio. Along with 40 sows, they grow corn, soybean, winter wheat and various cover crops. The weed control in the system where the rye was tilled was inadequate.

Project Coordinator:	James Tjepkema, **Rodale Institute**
Major Participants:	**University of Wisconsin:** J. Doll, T. Bauer
Farmers:	**Iowa:** R. Thompson; **Michigan:** R. Fogg; **Missouri:** R. Harmon; **Illinois:** T. Holsapple; **Ohio:** R. Bennett; **Wisconsin:** J. Bauer; **Nebraska:** G. Zicafoose
Project Duration:	2 Years
Total Funding:	LISA Funds: $60,150; Matching Funds: $50,709